

**Proceedings of the Twenty-First
NASA Propagation Experimenters
Meeting (NAPEX XXI)**

and the

**Advanced Communications
Technology Satellite (ACTS)
Propagation Studies Miniworkshop**

Held in El Segundo, California
June 11–13, 1997

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ABSTRACT

The NASA Propagation Experimenters (NAPEX) meeting is convened each year to discuss studies supported by the NASA Propagation Program. Representatives from the satellite communications industry, academia and government who have an interest in space-ground radio wave propagation are invited to NAPEX meetings for discussions and exchange of information. The reports delivered at this meeting by program managers and investigators present recent activities and future plans. This forum provides an opportunity for peer discussion of work in progress, timely dissemination of propagation results, and close interaction with the satellite communications industry.

NAPEX XXI took place in El Segundo, California on June 11–12, 1997 and consisted of three sessions. Session I, entitled “ACTS Propagation Study Results & Outcome ,” covered the results of 20 station-years of Ka-band radio-wave propagation experiments. Session II, “Ka-band Propagation Studies and Models,” provided the latest developments in modeling, and analysis of experimental results about radio wave propagation phenomena for design of Ka-band satellite communications systems. Session III, “Propagation Research Topics,” covered a diverse range of propagation topics of interest to the space community, including overviews of handbooks and databases on radio wave propagation. The ACTS Propagation Studies miniworkshop was held on June 13, 1997 and consisted of a technical session in the morning and a plenary session in the afternoon. The morning session covered updates on the status of the ACTS Project & Propagation Program, engineering support for ACTS Propagation Terminals, and the Data Center. The plenary session made specific recommendations for the future direction of the program.



PREFACE

The NASA Propagation Experimenters (NAPEX) meeting is convened each year to discuss studies supported by the NASA Propagation Program. The reports delivered at this meeting by program managers and investigators present our recent activities and future plans. Representatives from the satellite communications industry, academia and government who have an interest in space-ground radio wave propagation are invited to NAPEX meetings for discussions and exchange of information. This forum provides an opportunity for peer discussion of work in progress, timely dissemination of propagation results, and close interaction with the satcom industry. NAPEX XXI took place at Embassy Suites Hotel in El Segundo, California on June 11–12, 1997 and consisted of the welcome, opening remarks, and three sessions. Steve Townes, the Manager of Space Communications Technology Program at JPL, welcomed the participants on behalf of our NASA sponsor, Ramon Depaula. Townes commended the close interaction between the program and industry, and called for an even closer partnership and sharing of resources. N. Golshan, the JPL technical manager for the Propagation Program, made the opening remarks, recognizing the outstanding work of the NASA Propagation Experimenters community, excellent participation by the U.S. satellite communications industry, and NASA's foresight for timely investment in this critical technology for utilization of the Ka-band.

Session I, entitled " ACTS Propagation Study Results & Outcome" was chaired by L. Ippolito of Stanford Telecom and covered the results of 20 station-years of Ka-band radio wave propagation experiments. Session II, "Ka-band Propagation Studies and Models" was chaired by F. Davarian of Hughes Space and Communications; it addressed the latest developments in modeling, and analysis of experimental results about radio wave propagation phenomena for design of Ka-band satellite communications systems. Session III, "Propagation Research Topics" was chaired by W. Vogel of University of Texas at Austin, and covered a diverse range of propagation topics of interest to the space community including overviews of handbooks and databases on radio wave propagation. The ACTS Propagation Studies miniworkshop was held on June 13, 1997 and consisted of a technical session in the morning and a plenary session in the afternoon. The morning session was chaired by R. Bauer of NASA LeRC; it covered updates on the status of the ACTS Project & Propagation Program, engineering support for ACTS Propagation Terminals, and the Data Center. The plenary session was chaired by D. Rogers of Communications Research Center and W. Vogel. The plenary session made important recommendations for the future direction of the program.

The success of the meeting owes a lot to the speakers and session chairs and the active participation of all attendees. Special thanks are due S. Townes of JPL and R. Depaula of NASA HQ for the programmatic support of the NASA Propagation Program. I would like to express my thanks to R. Bauer, my counterpart at NASA LeRC for his support of the NASA Propagation Program through the ACTS Project. Last but not least, I would like to thank Mardy Wilkins of JPL for meticulously taking care of many administrative details of the meetings and to C. Cordaro of JPL Technical Information Section for coordinating the publication of this document.

The next ACTS workshop will be held in Boca Raton, Florida on or around November 18,19, 1997. The Next NAPEX meeting will take place in late May or early June of 1997 in Austin,Texas; the exact time and location will be announced by December 1997.

-N. Golshan